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Frequently Asked Questions

EPA's Program to Reduce Pollution from Outdoor Wood-fired Hydronic Heaters

What is an outdoor wood-fired hydronic heater?
Outdoor wood-fired hydronic heater is another name for an outdoor wood-fired boiler or outdoor wood furnace. These heaters use wood to heat water which is then piped underground to a nearby building (usually a home), providing both heat and hot water to the structure. An outdoor wood heater resembles a small shed with a smokestack and typically is located on the outside of the building to be heated.

Most outdoor wood heaters are sold for use in rural, cold-climate areas where wood is readily available; however, the units can be found throughout the United States.

Why are outdoor wood-fired heaters a problem?
Current outdoor wood heaters are significantly more polluting than other home-heating devices. They can create heavy smoke, which can be a nuisance, in addition to posing risks to public health in populated areas. This is most likely when heaters are used improperly or located too close to homes.

Why is EPA creating a voluntary program instead of regulating these heaters?
We want to reduce emissions from outdoor wood-fired hydronic heaters as quickly as possible. EPA's voluntary program will help bring cleaner heaters to market much faster than we could accomplish under a traditional federal regulation. The Agency also has provided support for NESCAUM to develop a model rule that State, local and tribal governments can tailor to address their specific needs and concerns. We believe this is the right approach at this time. EPA believes the voluntary program, model rule (and appropriate State, local, and tribal rules) and education about best burning practices will help significantly reduce emissions from outdoor wood-fired hydronic heaters.

Why is EPA encouraging the sale and purchase of cleaner outdoor wood-fired hydronic heaters?
EPA does not encourage the sale of any particular heating device. Current outdoor heaters are substantially more polluting than other home-heating devices. For consumers who choose to purchase an outdoor wood heater, EPA encourages the purchase of cleaner units that meet EPA voluntary emissions levels. In addition, the Agency urges owners of these devices to ensure that they are properly located, operated, and maintained. Improper location of outdoor heating units too close to neighbors can increase exposure to pollution and cause possible health effects.

Several manufacturers of outdoor wood heaters have said the heaters are as clean as indoor woodstoves. Is this true?
No. When we determine how clean or polluting a unit is, we look at total emissions per hour, along with stack heights and proximity to other structures to estimate emissions and their impact on air quality and health. Outdoor wood heaters burn significantly more wood than woodstoves -- often 10 times as much or even more. As a result, they emit much more smoke – and that means more particle pollution. Outdoor wood heaters also typically have short stacks that are close to nearby structures, meaning that the stacks are not usually above the roofline. As a result, wood heater emissions do not disperse as well as the emissions from typical woodstoves.

How much cleaner than other outdoor wood heaters are heaters that meet EPA's emissions level?
Heaters that meet EPA's emissions level are about 70 percent cleaner. Most existing outdoor wood-fired hydronic heaters emit about 2 pounds of fine particle pollution per million BTUs of heat input (i.e., wood burned). To qualify as a cleaner unit under EPA's voluntary program, a unit should emit no more than 0.60 pounds of fine particles per million BTUs.

Is it true that to qualify under the EPA Phase 1 voluntary program, an outdoor wood-fired hydronic heater (OWHH) must burn about 20 percent cleaner than a non-catalytic indoor wood stove?
No. The test methods used in EPA's OWHH voluntary program and in EPA's New Source Performance Standard (NSPS) for indoor woodstoves are closely related, and both originated from the same method. The woodstove NSPS emission standard cannot be directly compared with the OWHH Phase 1 emission level, however, because the measurement units are different. When the OWHH Phase 1 emission level is converted to the same measurement units used in the woodstove NSPS emission standard, the OWHH Phase 1 emission level can be 4 to 10 times dirtier than the woodstove NSPS emission standard.

Who verifies that these units are cleaner?
Participating manufacturers will have their heaters tested by independent accredited laboratories. The results of the tests for qualifying models will be made available on EPA's website at www.epa.gov/woodheaters.

How many manufacturers have agreed to make cleaner units? Can they really get the units to market by spring?
Eleven manufacturers have agreed to use their best efforts to make one or more cleaner OWHH models. These manufacturers represent over 80% of the current sales in the United States. Some units are expected to become available beginning this spring; others are expected by fall.

How many cleaner models will be available in the spring?
We are not certain yet. Some manufacturers have indicated that their units will be ready for spring sale. Until EPA receives and reviews the test data and other materials on those units, we do not know which models will meet the performance specifications. EPA will

list models that meet the performance specifications on our website at www.epa.gov/woodheaters.

Have most manufacturers signed the partnership agreement? If not, why?
To date, eleven manufacturers have signed the agreement to participate in this voluntary program. These include the largest U.S. manufacturers of outdoor wood-fired heaters, and represent over 80% of current sales. The manufacturers participating so far are: Aqua-Therm, Black Bear/Clean Wood Heat, Burns Best, Central Boiler, Hardy Manufacturing Co., Heatmor, Mahoning Outdoor Furnace, Pro-Fab Industries, Taylor Manufacturing, Woodmaster /Northwest Manufacturing, and Sequoyah Paradise.

EPA encourages other manufacturers to sign the voluntary partnership agreement as well.

How will consumers know which units are cleaner?
Consumers should look for the orange hang tag that identifies the unit as meeting the performance specifications of EPA's voluntary program. These heaters should also have a permanent label affixed to the unit. Pictures of the labels and tags are available on EPA's website at www.epa.gov/woodheaters. Information also will be available where outdoor wood-fired hydronic heaters are sold.

How many outdoor wood-fired hydronic heaters are in use in the U.S?
Estimates vary, but we believe there are more than 100,000 OWHH currently in use, mostly in the Northeast and upper Midwest. NESCAUM estimates that more than 155,000 units have been sold since 1990.

Do all areas allow outdoor wood-fired hydronic heaters? How do I find out?
Not all areas allow the use of outdoor wood heaters. Some areas that allow their use regulate location and stack height; your state or local air agency can tell you what your area allows. For information on how to reach your air agency, visit EPA's website at www.epa.gov/woodheaters and click on "Where You Live."

What states and local governments regulate or ban outdoor wood heaters now?
Many states and local governments use nuisance or opacity regulations to regulate outdoor wood heaters. A number of local governments ban new heaters and/or regulate the minimum distance they can be sited from neighbors or public areas. Only three states, Connecticut, Washington and Vermont, have regulations specific to wood heater use. Visit www.epa.gov/woodheaters, and click on "Where You Live," to learn more about state air programs and regulations for outdoor wood heaters.

How much does an outdoor wood-fired hydronic heater cost, and will a cleaner one cost more?
Outdoor wood heaters cost about $5,000 to $15,000, depending on the size of the unit. The changes to improve the efficiency of these units and reduce emissions could increase the price by about 15 percent. This upfront increase in price should be recouped because the cleaner models will operate more efficiently and will require less wood for the same heat output.

Where can you purchase a cleaner outdoor wood-fired hydronic heater?
Cleaner models will be identified beginning in April, and a list of partners is available on the EPA web site. These manufacturers sell directly to the public and also through dealers.

Is there a tax credit for purchasing a cleaner outdoor wood-fired hydronic heater?
Currently there is no federal tax credit. However, you should check with your state to determine if a state credit is available.

Can you use retrofit technology to make an existing wood-fired hydronic heater cleaner?
Although not currently available, some wood heater and emission control device manufacturers are working on possible retrofits. EPA is encouraging manufacturers to continue these efforts.

How can a manufacturer join the partnership and have their product tested?
Contact EPA at owhh@epa.gov to apply as a new partner.

Does it matter what people burn in outdoor wood-fired hydronic heaters?
Yes! Use of the wrong fuels in outdoor heaters can decrease the efficiency of your heater, increase pollution, and be dangerous. If you have an outdoor wood heater, only use fuels recommended by the manufacturer, such as seasoned, untreated wood. Do not use accelerants such as lighter fluids, gasoline or chemicals to start your fire. And NEVER burn garbage, leaves, paper products, cardboard, plastics, rubber or wood treated with petroleum products (such as particle board, railroad ties and pressure-treated wood).

For a more efficient burn, follow the manufacturer's recommended loading times and amounts. Visit EPA's website for more information and recommendations for safe wood burning practices at www.epa.gov/woodheaters.

What are the health effects of smoke from outdoor wood-fired hydronic heaters?
Wood smoke contains both fine particle pollution (PM 2.5) and a number of air toxics. Fine particle pollution is linked to a variety of health problems, including aggravated asthma, reduced lung function, development of chronic bronchitis, irregular heartbeat, non-fatal heart attacks and premature death in people with heart and lung disease. Children, people with heart and lung disease, and older adults are most vulnerable to the effects of fine particle pollution.

To learn more about the health effects of fine particle pollution and to get information about particle pollution levels in your area, visit www.airnow.gov.

Residential wood combustion emissions also contain harmful air pollutants like sulfur oxides, nitrogen oxides, and carbon monoxide, and air toxics with potentially cancer-causing compounds, including polycyclic aromatic hydrocarbons, benzene, formaldehyde and dioxins. Some of these pollutants are known to cause cancer, but their effects on human health from exposure to wood smoke have not been extensively studied.

Why does burning driftwood release toxic fumes?
Driftwood contains salt (sodium chloride), which contains chlorine. When improperly burned, salt can form dioxin, which is toxic even at very low levels.